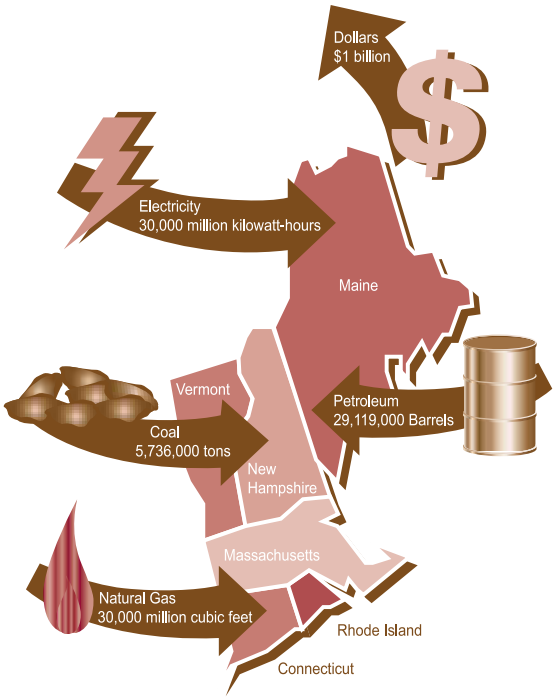
The Northeast Region

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

Importing Energy

The Northeast region stretches from Maine to the Mid-Atlantic. As a whole, the Northeast region uses fossil fuels to generate more than half its electricity. The region also relies on nuclear power to generate about one-third of its electricity and supplements its needs with power imported from Canada and the Central region. For example, New Jersey imports one-third of its electricity at a cost of approximately $2 billion. The region's electricity rates are among the highest in the nation.



New England sends about $1 billion each year to other regions for the fuel it uses in its power plants.

The Search for Diversity

In the early 1970s, New England relied on oil-fired plants for as much as 60 percent of its electricity. Then, in response to the oil embargoes and the increasing cost of oil, New England utilities began to diversify their generation mix, adding nuclear power and converting oil facilities to coal-burning plants. As a result, today New England depends on nuclear power for 40 percent of its electricity and coal for almost 20 percent.

Much of the nuclear power, however, may soon become unavailable. The operating licenses of five of New England's eight nuclear generating units are due to expire by 2010. The operator of at least one of those nuclear plants does not intend to renew its license, and other plants may be shut down before their operating licenses expire.

As nuclear power's contribution decreases, any increased use of coal will heighten New England's air pollution problems. Coal plant emissions contribute significantly to acid rain and smog in the region and will soon become the dominant source of airborne emissions.

The Mid-Atlantic states face environmental problems. High population density, extensive use of fossil fuels for transportation, and fossil-fueled power plants cause air quality problems in this area. As a result, the U.S. Environmental Protection Agency has designated large portions of the Mid-Atlantic as violating the air quality standards set for ozone, and has classified New York City as exceeding carbon monoxide standards. Nitrogen oxide emissions are now also being targeted by the U.S. Environmental Protection Agency, and substantial state-by-state reductions are being proposed.

What options does the region have for reducing the use of coal and preparing for reduced nuclear generation? Its power producers are following the national trend toward a greater reliance on natural gas-fired generators. In fact, there are several gas-fired merchant power plants coming on line. Pursuing this strategy will keep the region dependent on imported resources and vulnerable to price fluctuations. New England is also physically limited in the amount of power that can be imported over the transmission lines from Canada.

The other supply option that is being explored is renewable energy. This option draws on ample, readily available renewable resources; provides economic and environmental benefits; and is generally greeted by a supportive public.

Biomass Power Fuels the Northeast

Roughly 90 percent of Maine is covered with forest — more than any other state. The timber industry in Maine is one of the state's largest employers, and power producers have relied on wood and wood waste to provide as much as 25 percent of the state's electric power, supporting as many as 2,500 jobs in the process. Today, Maine relies on waste from timber and other sources for about 500 megawatts of capacity.

Similarly, Vermont, with about 80 percent of its land covered by forests, currently receives about 20 percent of its power (165 megawatts) from a diverse mix of renewables, including hydropower, wind energy, and biomass resources such as wood and refuse. New York is estimated to have nearly 4,000 megawatts of biomass potential.

Growing Willows for Power Generation

Niagara Mohawk Power Corporation of New York, representing the Salix Consortium, has entered a cost-sharing cooperative research and development agreement with the U.S. Department of Energy to grow willows as an energy feedstock, generating electricity from this renewable fuel. The project is part of the White House's Biomass Power for Rural Development Initiative.

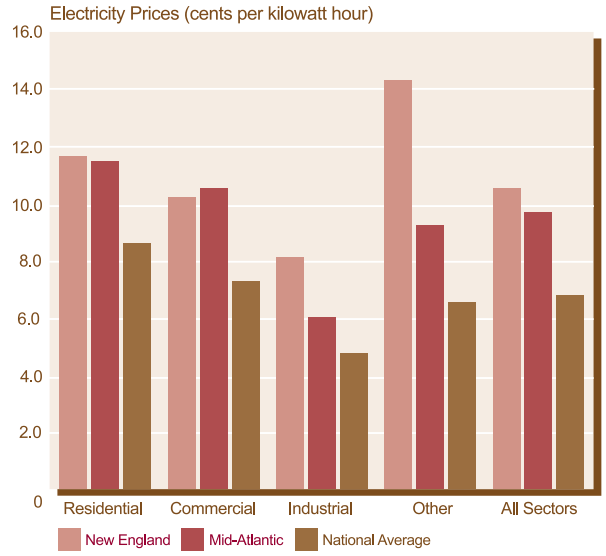
The project is a multiphase effort to establish willow trees as one of the first commercial energy crops for production by the year 2000. The Salix Consortium pools the combined research and investment power of more than 25 corporations, associations, academic institutions, and regional government agencies with five power-generating companies. Together, they will develop a new energy crop on 2,600 acres of land during the first phase of the project. The various facilities involved in this project are expected to produce between 37 and 47 megawatts of electric power through cofiring of the biomass.

This project is estimated to cost about $14 million over a 6-year period, with a 45 percent federal investment. A major goal will be to achieve a delivered cost of willow feedstock without subsidies at less than $2 per million British thermal units by 2001. The projected 40,000 to 60,000 acres of willow trees (in central and western New York alone) to be planted by 2010 will produce energy crop fuel sales of almost $20 million annually. As many as 300 new jobs will be created in rural areas of New York alone once the project is fully implemented.

This project will not only help farmers and landowners maximize their earning potential through crop diversification and alternative land use, it will help meet our nation's environmental challenges. For the local environment, the willow project improves watershed control and soil conservation. Wood ash from combustion can also be recycled back to the land to improve the soil.

For the regional environment, willow contains virtually no sulfur and may reduce nitrogen oxide emissions when cofired with coal, helping to reduce acid rain. In terms of the global environment, the willows take carbon dioxide out of the air when they grow, then release it again when burned, for a net zero contribution to carbon emissions.

One biomass power plant in particular, the McNeil Generating Station in Burlington, Vermont, is leading the Northeast into a new era of biomass power production. Although almost all biomass power facilities use direct burning of the biomass to produce power, the 50-megawatt McNeil plant is testing a prototype of a brand new technology—an efficient biomass gasifier. One of the nation's largest wood-burning facilities, the McNeil plant is increasing its power output by 30 percent with the new gasifier, which is being installed under a cost-shared agreement with the U.S. Department of Energy.



Direct burning of wood converts only 25 percent of the wood heat into electricity. The new technology, developed by Battelle Columbus Laboratory under a U.S. Department of Energy program, gasifies the wood — it converts wood to a gas similar to natural gas. This gas is then burned in a modified gas turbine to produce electricity. This technology is not only 40 percent more efficient than the technology the McNeil plant currently uses, but it is also cleaner. Because of this greater efficiency, the cost of the electricity generated will approach that of conventional fossil-fuel generation.

Untapped Resources: Wind and Solar

New England's wind resource may be as great as that of biomass, and equally as accessible. The winds are consistent and strong along most of the coastline and along the ridges and hills that dominate New Hampshire, Massachusetts, Vermont, and Maine. Maine could potentially rely on strategically placed wind turbines to provide more than four times the electricity the state currently uses. Vermont could rely on wind for nearly all of its electricity, and New Hampshire could use wind to supply nearly half of its needs.

Although New England has not aggressively taken advantage of its wind resources, several communities and power producers are beginning to tap its potential. On Nantucket

Island, where the winds run at average speeds of 18 mph, the town of Nantucket has decided to install wind turbines to power a solid-waste processing facility. The town estimates that the wind turbines could generate electricity for 4.5 to 5 cents per kilowatt-hour.

Another wind plant has been built on a ridge near the town of Readsboro, in southern Vermont. The 6-megawatt wind plant uses 11 550-kilowatt wind turbines to generate approximately 12 million kilowatt-hours of electricity per year—enough electricity to power 1,500 homes. Green Mountain Power pooled nearly $7 million of its own money with $3.5 million provided by the Electric Power Research Institute and the U.S. Department of Energy to build the wind plant.

Utilities are exploring various options for using photovoltaics. Conectiv Power Delivery, formerly known as Delmarva Power and Light Company, is testing the concept of using photovoltaic systems as a utility load reduction program. Initial results have shown that such systems are a cost-effective alternative to capacity additions. Niagara Mohawk Power Corporation has a similar photovoltaic demonstration project, and New York State Electric and Gas Company has installed photovoltaic systems for both roof-top and off-grid uses. Moving beyond demonstrations, General Public Utilities (GPU) has a joint venture through its subsidiary, GPU International, with AstroPower, Inc., to manufacture and market photovoltaic systems. The systems range in size from 1 to 4 kilowatts. The local utility in Gardner, Massachusetts, equipped 28 houses with 2-kilowatt photovoltaic systems as an experiment in residential photovoltaic applications and distributed generation. The photovoltaic systems have operated successfully and the utility plans to expand that program next year.

Bill Eager

Photovoltaics and small hydropower have the potential to reduce New England's dependence on coal and nuclear power. This furniture factory in Gardner, Massachusetts, incorporates photovoltaic panels into its design.

Renewable Policies Integral to Electric Restructuring

States in the Northeast are among the leaders in bringing competition to the electric industry.

Rhode Island became the first state in the country to phase in retail electric competition in 1998. The state adopted a nonbypassable "systems benefit charge" (SBC) that is imposed on electric customers through 2002 to support programs in energy efficiency and renewables. The 0.23 cents per kilowatt hour charge will create a fund of about $20 million annually. To date, the fund has supported investments in photovoltaic systems resource assessment, and possible investment in a small wind project. New York also has a SBC that is in effect from 1998 through 2001. About $234 million will be collected over 3 years, and about $11 million will be expended on renewables, mostly for wind and photovoltaics.

Maine became the first state to adopt a renewable portfolio standard (RPS) when the state enacted restructuring legislation in 1997. The 30 percent RPS, the highest in the nation, reflects the state's plentiful renewable resource base and state policies to utilize that resource base. Interestingly, the Maine RPS is not just limited to renewables in the state but encompasses all renewables in New England. The state also allows fuel cells and high-efficiency cogeneration systems to qualify.

In Pennsylvania, customer choice under restructuring is already providing cost savings to consumers who switch suppliers. Three green power marketers are offering environmentally sensitive retail electricity products and wind power is emerging as an important component of those offerings.

Connecticut, Massachusetts, and New Jersey have enacted both an RPS and an SBC for renewables. The three states have split their RPS into two parts, one to cover existing renewable facilities (typically hydropower, biomass and municipal solid waste), and another to cover emerging renewable technologies such as wind, solar, and biomass gasification. A combined RPS and SBC expands the available market opportunities for renewables, as the RPS will likely assist renewables that are closest to prevailing electric market prices, and the SBC will assist emerging renewable technologies that are at an earlier stage of development.